The Online Coffee Klatch: What Tech Women are Talking About

Emergent Research Forum

Deborah J. Armstrong
Florida State University
djarmstrong@business.fsu.edu

Ibtissam Zaza
Florida State University
iz13@my.fsu.edu

Abstract

Though the topic has been a focus of study for years, researchers are still grappling with the antecedents of turnover for women in technology-related professions. One potential antecedent of turnover that has yet to receive much attention in the information systems (IS) literature is gender discrimination. As a first step, the goal of this study is to understand what is on the minds of tech women regarding gender discrimination, and the potential link between perceived gender discrimination and turnover intention. To address this goal, emails posted over two years to a forum for women involved in computing were analyzed using Semantria for Excel. This analysis allowed us to study large quantities of unstructured data culled from the women's email communications. Based on the preliminary analysis, it appears that the perception that women are unwelcome in the technology-related professions persists. The next steps and potential implications are provided.

Keywords

Gender, discrimination, turnover intention, workforce.

Introduction

Women have been consistently underrepresented in the STEM disciplines, and recent reports in the popular press tell us that women are leaving STEM and particularly technology-related professions en masse (e.g., Lien 2015). Peck (2015) provides evidence that women's participation in the computing and mathematical occupations has dropped from 35% in 1990 to 26% in 2013. Even high profile tech companies like Facebook and Twitter that are developing initiatives to address bias toward women have disappointing numbers. For example, at Google women comprise 30% of their workforce, but fill only 17% of technology-related jobs. Even though the topic has been a focus of study for years (e.g., Ahuja 2002), researchers are still grappling with the antecedents of turnover for women in technology-related fields such as information technology (IT) (e.g., Armstrong et al. 2012; Joseph et al. 2015). Perhaps it is time to re-evaluate our models of turnover and look to other factors that may be causing the exodus of women from technology-related professions.

One potential antecedent of turnover that has yet to receive much attention in the literature (for exceptions see Ahuja 2002; Quesenberry et al. 2012; Riemenschneider et al. 2006) is gender discrimination which can be conceptualized as the practice of unfairly treating female members of a workplace group differently from male members such that it creates a disadvantage (Dipboye and Halverson 2004). In one of the few studies that directly addresses the relationship, gender discrimination was associated with increased turnover intentions of female audit professionals (e.g., Dalton et al. 2014). As a first step in exploring perceived gender discrimination as an antecedent of turnover intention within the technology-related professions, the goal of this study is to understand what is on the minds of women working in technology-related positions regarding discrimination, and whether there might be a link between perceived gender discrimination and turnover intention.

To address this goal, we use qualitative inquiry to explore the issues and concerns regarding gender discrimination shared within a female-friendly technology-focused forum. Emails posted over two years to a forum for women involved in the technical aspects of computing were analyzed using Semantria for

Excel. This qualitative analysis allowed us to study a large quantity of unstructured data collected from email communications. The 'Top 10' most discussed topics are identified, and six of these are related to gender discrimination. Based on the preliminary analysis of the conversation topics, it appears that the negative perception that women are unwelcome in the technology-related professions persists.

Theory and Literature Review

Discrimination has been defined as unequal/unjust on-the-job treatment of different social categories of people, especially on the grounds of race, age, or sex (Greenhaus et al. 1990). In a work environment, Kanter (1977) asserts that a lack of participation and/or representation may drive discrimination, as organizational structures are shaped by the dominant group, not the minority. There are two classifications of discrimination: access (limits entrée to the job/profession based on non-job-related factors such as gender or age; Kanter 1977) and treatment (discrepancies in job outcomes based on non-job-related factors; Truman and Baroudi 1994). Consistent with other discrimination-related research in IT (e.g., age – Quan et al. 2008; occupational segregation – Panteli et al. 1999; wage – Ang et al. 2002; Joseph et al. 2015) we are focused on treatment discrimination of women in technology-related professions (i.e., gender discrimination).

Gender discrimination theory asserts that the disadvantaged position women have in the workplace is a result of a male-controlled power structure (Anker 1997). Within the IT literature, gender discrimination theory has been used to identify non-job-related factors that account for wage differentials (Sumner and Niederman 2003-2004); and access to career opportunities and rewards (Trauth et al. 2009). Outside the IT field, gender discrimination has been associated with negative outcomes such as lower job satisfaction (e.g., Carr et al. 2003), decreased organizational citizenship behaviors (e.g., Dalton et al. 2014), and increased turnover intentions (e.g., Dalton et al. 2014). In addition, it has been found that gender discrimination not only affects the target of the mistreatment, but has been shown to negatively influence those who witness the mistreatment (Glomb et al. 1997) thus making this issue of organizational concern.

In 1954, Gordon Allport, a leader in the study of discrimination, documented the steps by which an individual behaves negatively toward members of another group. The first step is antagonism. *Verbal antagonism* includes slurs and provocative or disparaging comments, either in or out of the individual's presence (Allport 1954). These comments may not be regarded as unlawful, but they create a clear form of hostility. *Non-verbal antagonism* can be communicated by such behaviors as cutting an interaction short, avoiding eye contact, making negative gestures, or sitting so far away from an individual so as to communicate dislike. Together these expressions of antagonism can create tense social interactions and potentially a hostile environment (Hebl et al. 2000).

As a first step, the goal of this study is to understand what is on the minds of tech women regarding their work environment, antagonism in their social interactions, and gender discrimination, and the potential link between perceived gender discrimination and turnover intention. In essence, do women perceive that they are unwelcome in technology-related professions? Using gender discrimination theory as our lens, our research questions are: 1) what is on the minds of women working in technology-related professions regarding gender antagonism and gender discrimination, and 2) is there a link between perceived gender antagonism / discrimination and turnover and turnaway for women working in technology-related professions? In the next section we explore the method used to address these research questions.

Method and Results

This research explores the dialogue shared in an online forum created for women involved in the technical aspects of computing to document perceptions of gender discrimination across technology-related professions. The forum has over 6,000 members from at least 60 countries around the world. This forum provides women a private space to seek advice from their peers, and discuss the challenges they share as women technologists. Participants include women technologists of all ages and at any stage of their studies or careers. To join the forum an individual signs up (provides basic information such as name, email, affiliation) from the organization's website.

From the forum's email digest we saved all the emails as text file (.txt) in order to extract information from the text file into Excel to conduct our qualitative analysis. The email date, subject line heading, email

text and poster's email were captured. We used R version 3.2.2 (R project for statistical computing; https://www.r-project.org/) to facilitate the initial extraction of the emails. R is an open source programming language and environment for statistical computing. Second, we created a script to read the text file and extract the details of each email and store the data in Excel. Once the data was extracted and saved in Excel, the Semantria for Excel was used to further analyze the data. Semantria for Excel is an add-in that provides text analytics of input content directly in Excel. For this initial analysis, the subject lines of 9800 emails posted over a two-year period (October 15, 2013 – January 15, 2016) were analyzed. The purpose of this initial analysis was to identify what the women in the forum were 'talking about.' The top ten topics (found in the email subject line) with the highest number of posts were further explored. The reasoning behind this choice was a view that these were the most popular conversations and likely meaningful to the women. Of the 'Top 10' topics identified, six were related to gender discrimination. These six topics are presented with the number of email posts in the conversation and a brief summary of the email that initiated the dialogue.

Topic	Year	Count	Summary of Initial Post
GoDaddy partnership	2014	43	This connection between GoDaddy and XXXX feels sleazy. Can someone please tell me why XXXX hasn't pulled the plug on this?
Bechdel test rating	2013	32	An article about female scientist fixates on her sex as if it's the most remarkable thing about her. When you emphasize a woman's sex, you inevitably end up dismissing her science. Alison Bechdel created test to measure gender bias in film, I'd like to propose a test for stories about women in science. We don't write "Redheads in Science" articles, so why do we keep writing about scientists in the context of their gonads?
Women leaving tech industry	2015	31	LA Times article about how the subtle but persistent sexism in the tech industry is driving women away. http://www.latimes.com/business/la-fi-women-tech-20150222-story.html
Women feel unwelcome in STEM fields	2014	30	The ESA [European Space Agency] can land their robot on a comet. But they still can't see misogyny under their noses. I find the shirt [pinup girl Hawaiian shirt] makes me feel unwelcome. I hate that a scientist in such an important project saw fit to wear something like that.
Inappropriate celebration	2014	29	How to pick when to speak up and when to ignore plain stupidity coming from academically-smart men? [referencing nude picture of woman at work celebration]
Gender harassment	2014	28	Female developer quits start up XXXX due to gender harassment in its internal policies and organizational culture.

Table 1. Top Six Gender Discrimination-related Topics

The "Women leaving tech industry" topic consisted of 31 email posts over three days, with six posts on day 1, 21 on day 2, and four on day 3. There were 26 participants in the discussion, with 18 posting one time, five posting twice and only one woman (the initiator of the thread) posting three emails. The original email post stated:

I'm really happy to see the not-so-subtle shift happening in the reporting on women-in-tech issues these days. Things are going from "whyyyyy are there no women?! What could possibly be the problem!?" to "hey sexism is a thing that women are facing - and leaving the industry because of - so let's do something about it".

From the "Women leaving tech industry" topic there were several email posts that support the idea of gender discrimination as an antecedent of turnover (and turnaway) intention. For example:

It's not just the start-up culture. It's everywhere. My description of some of this behavior is that when you walk in, you get the hairy eyeball. That skeptical look that says "You're not like me, I'm not sure you should be here."... I spent 25 years in technical positions, always rated "average", never getting promoted except by changing companies, and I finally just gave up. I was worn out with working twice as hard to still be rated as inferior to the male slacker in the next cubicle. I have been astonished that the problems young female engineers are reporting are just the same as they were in 1985. At least now there are laws against discrimination. But it is so depressing that the basics of the culture just haven't changed much.

I cannot understand why they would add this quote: ..."The pipeline may not improve much unless women can look ahead and see it's a valuable investment." Despite the fact that they present all those cases where women have been driven away, they insist on the fact that companies are eager to hire women and minorities and the above quote only serves to throw the ball on our side, like somehow women are at fault for not seeing the value here ...

I feel like the person who wrote it [the article] didn't understand the actual situation too well ... For example, a person who only reads the headline and the side quote might draw the conclusion that it's the women's fault for leaving the industry, ergo they shouldn't go in tech from the beginning. Sadly, people who are unfamiliar with the subject might do just that, and the real message with what is going on could go unnoticed on a certain level.

Our preliminary findings indicate that gender antagonism and gender discrimination is a concern for women in technology-related professions. There is evidence of a link between perceived gender antagonism/discrimination and turnover intentions for women working in technology-related professions, thus addressing our research questions.

Next Steps

The goal of this study is to understand what is on the minds of tech women regarding gender discrimination, and the potential link between perceived gender discrimination and turnover intention. From our initial analysis of the data from the women in the forum, gender discrimination appears to be a concern for women in technology-related professions. Moving forward, we believe the first step is to analyze all of the email postings within each of the six gender-discrimination related topics to determine the full content and identify sub-themes of each conversation. To accomplish this, a grounded theory methodology (Urquhart et al. 2010) will be employed. It is our intention to build a model of turnover intentions that captures unexplored antecedents such as gender discrimination.

We would like to analyze the full dataset (21,000 records to date) to determine the most prevalent themes (higher level concepts comprised of related topics) in the forum over time. This analysis can be used to determine future research avenues including the exploration of the changes in the dialogue (i.e., topics and themes) over time, if the dialogue is consistent over time, or if perhaps there are cyclical patterns in the dialogue over time. A further step will be to conduct a sentiment analysis (which studies the mood, opinions and attitudes expressed in written text) on the data to see if this provides additional richness to the data to answer the research questions. The results from this stream of research may significantly improve our understanding of gender discrimination in the technology-related professions and potentially expand the nomological network of turnover and turnaway theories.

REFERENCES

Ahuja, M. K. 2002. "Women in the Information Technology Profession: A Literature Review, Synthesis and Research Agenda," *European Journal of Information Systems* (11:1), pp. 20-34.

Allport, G. W. 1954. *The Nature of Prejudice.* Reading, MA: Addison-Wesley.

Ang, S., Slaughter, S., and Ng, K. Y. 2002. "Human Capital and institutional Determinants of Information Technology Compensation: Modeling Multilevel and Cross-Level Interactions," *Management Science* (48:11), pp. 1427-1445.

Anker, R. 1997. "Theories of Occupational Segregation by Sex: An Overview," *International Labor Review* (136:3), pp. 315-339.

Armstrong, D. J., Nelms, J. E., Riemenschneider, C. K., Reid, M. F. 2012. "Revisiting the Barriers Facing Women in Information Systems," *The Journal of Computer Information Systems* (53:2), pp. 65-74.

Carr, J. Z., Szalacha, L., Barnett, R., Caswell, C., and Inui, T. 2003. "A "Ton of Feathers": Gender Discrimination in Academic Medical Careers and How to Manage it," *Journal of Women's Health* (12), pp. 1009-1018.

Dalton, D. W., Cohen, J. R., Harp, N. L., and McMillan, J. J. 2014. "Antecedents and Consequences of Perceived Gender Discrimination in the Audit Profession," *Auditing: A Journal of Practice & Theory* (33:3), pp. 1-32.

Dipboye, R. L., and Halverson, S. K. 2004. "Subtle (and not so Subtle) Discrimination in Organizations," in *The Dark Side of Organizational Behavior,* R. W. Griffin and A. M. O'Leary-Kelly (eds.), San Francisco, CA: Jossey-Bass, pp. 131-158.

Glomb, T. M., Richman, W. L., Hulin, C. L., Drasgow, F., Schneider, K. T., and Fitzgerald, L. F. 1997. "Ambient Sexual Harassment: An Integrated Model of Antecedents and Consequences," *Organizational Behavior and Human Decision Processes* (71), pp. 309-328.

Greenhaus, J., Parasuraman, S., and Wormley, W. 1990. "Effects of Race on Organizational Experiences, Job Performance Evaluations, and Career Outcomes," *Academy of Management Journal* (33:1), pp. 64-86.

Hebl, M. R., Tickle, J., and Heatherton, T. F. 2000. "Awkward Moments in Interactions Between Nonstigmatized and Stigmatized Individuals," in *The Social Psychology of Stigma*, T. F. Heatherton, R. E. Kleck, M. R. Hebl, and J. G. Hull (eds.), New York, NY: The Guilford Press, pp. 275-306.

Joseph, D., Ang, S., Slaughter, S. A. 2015. "Turnover or Turnaway? Competing Risks Analysis of Male and Female IT Professionals' Job Mobility and Relative Pay Gap," *Information Systems Research* (26:1), pp. 145-164.

Kanter, R. M. 1977. *Men and Women of the Corporation*, New York, NY: Basic Books Inc.

Lien, T. 2015. "Why are Women Leaving the Tech Industry in Droves?" *Los Angeles Times,* February 22, 2015. Retrieved on 02/29/2016 from http://www.latimes.com/business/la-fi-women-tech-20150222-story.html.

Panteli, N., Stack, J., Atkinson, M., and Ramsay, H. 1999. "The Status of Women in the UK IT Industry: An Empirical Study," *European Journal of Information Systems* (8), pp. 170-182.

Peck, E. 2015. "The Stats on Women in Tech are Actually Getting Worse" *Huffington Post*, March 27, 2015. Retrieved on 03/01/2016 from http://www.huffingtonpost.com/2015/03/27/women-in-tech_n_6955940.html.

Quan, J., Dattero, R., Galup, S. D. 2008. "An Explorative Study of Age Discrimination in IT Wages," *Information Resource Management Journal* (21:3), pp. 24-38.

Quesenberry, J. and Trauth, E. M. 2012. "The (dis) Placement of Women in the IT Workforce: An Investigation of Individual Career Values and Organizational Interventions." *Information Systems Journal* (22:6), pp. 457-473.

Riemenschneider, C., Armstrong, D., Allen, M., and Reid, M. 2006. "Barriers Facing Women in the IT Work force." *The DATA BASE for Advances in Information Systems* (37:4), pp. 58-78.

Sumner, M., and Niederman, F. 2003-2004. "The Impact of Gender Differences on Job Satisfaction, Job Turnover, and Career Experiences of Information System Professionals," *Journal of Computer Information Systems* (44: 2), pp. 29-39.

Trauth, E. M., Quesenberry, J. L., and Huang, H. 2009. "Retaining Women in the U.S. IT Workforce: Theorizing the Influence of Organizational Factors," *European Journal of Information Systems* (18), pp. 476-497.

Truman, G., and Baroudi, J. 1994. "Gender Differences in the Information Systems Managerial Ranks: An Assessment of Potential Discriminatory Practices," *MIS Quarterly* (18:2), pp. 129-141.

Urquhart, C., Lehmann, H., and Myers, M. D. 2010. "Putting the 'Theory' Back into Grounded Theory: Guidelines for Grounded Theory Studies in Information Systems," *Information Systems Journal* (20:4), pp. 357-381.